Microelectronic Heat Pump Thermostats

T8511G

INSTALLATION INSTRUCTIONS

APPLICATION

The T8511G Microelectronic Heat Pump Thermostat provides electronic control of 24 Vac, two-stage heating and one-stage cooling heat pump systems. Refer to Table 1 for a general description of the thermostat. All T8511 Thermostats require a common wire to supply power.

Table 1. T8511 Thermostat Desription.

T8511	Changeover	System Selection	Fan Selection	Comments
G	Automatic	Em. Heat-Heat-Off-Auto-Cool	On-Auto	Use keyboard to make system and fan selections.

MERCURY NOTICE

If this control is replacing a control that contains mercury in a sealed tube, do *not* place your old control in the trash.

Contact your local waste management authority for instructions regarding recycling and the proper disposal of the old thermostat.

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow the instructions can damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After completing installation, use these instructions to check out the product operation.

CAUTION

Electrical Shock or Equipment Damage Hazard. Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.

Location

Install the thermostat about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature. See Fig. 1.

Do not install the thermostat where it can be affected by:

— drafts, or dead spots behind doors and in corners.
— hot or cold air from ducts.
— radiant heat from sun or appliances.
— concealed pipes and chimneys.
— unheated (uncooled) areas such as an outside wall behind the thermostat.

Wallplate Installation

Mount tthermostat horizontally on the wall or on a 2 in. x 4 in. wiring box.

1. Position and level the wallplate (for appearance only). The thermostat functions properly even when not level.

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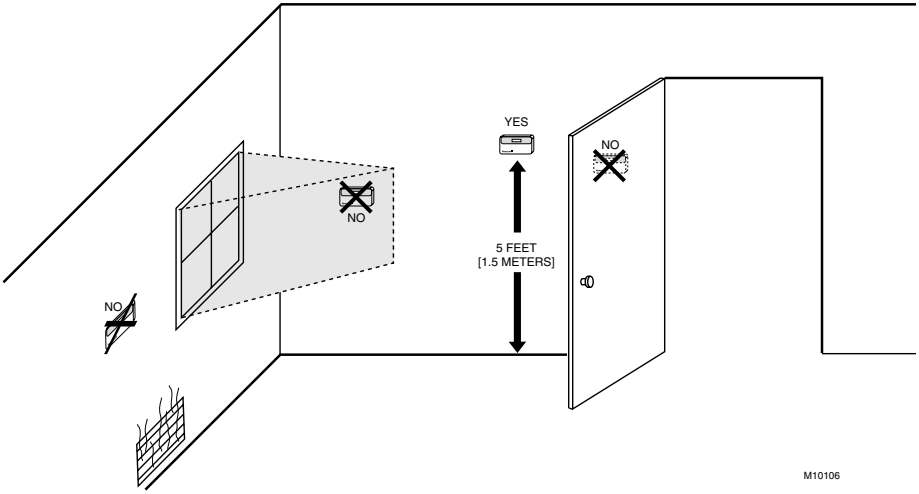


Fig. 1. Typical location of thermostat.

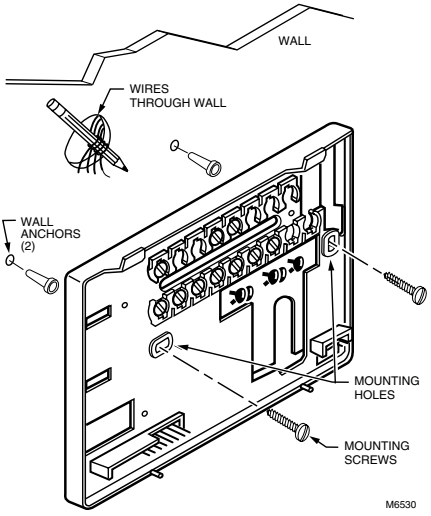


Fig. 2. Mounting the wallplate.

2. Use a pencil to mark the mounting holes. See Fig. 2.
3. Remove the wallplate from the wall and drill two 3/16 inch holes in the wall (if drywall) as marked. For firmer material such as plaster or wood, drill two 7/32 inch holes. Gently tap anchors (provided) into the drilled holes until flush with the wall.
4. Position the wallplate over the holes, pulling wires through the wiring opening.
5. Loosely insert the mounting screws into the holes.
6. Tighten mounting screws.

WIRING

All wiring must comply with local electrical codes and ordinances. Refer to Fig. 3 through 5 for typical hookups. A letter code is located near each terminal for identification.

⚠ CAUTION

Electrical Shock or Equipment Damage Hazard. Can shock individuals or short equipment circuitry.
Disconnect power supply before installation.

1. Loosen the terminal screws on the wallplate and connect the system wires. See Fig. 6.

IMPORTANT

Use 18 gauge, color-coded thermostat cable for proper wiring.

2. Securely tighten each terminal screw.
3. Push excess wire back into the hole.
4. Plug the hole with nonflammable insulation to prevent drafts from affecting the thermostat.

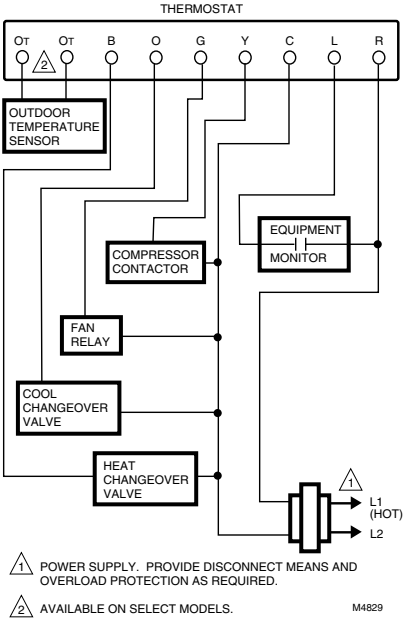


Fig. 3. Typical hookup in heat pump application.

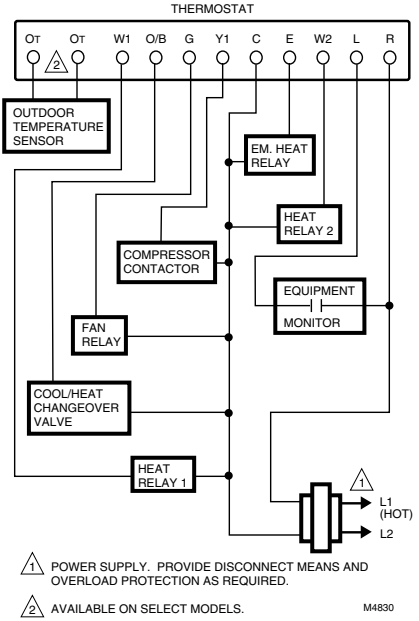


Fig. 5. Typical hookup in heat pump application with emergency heat relay and O/B terminal.

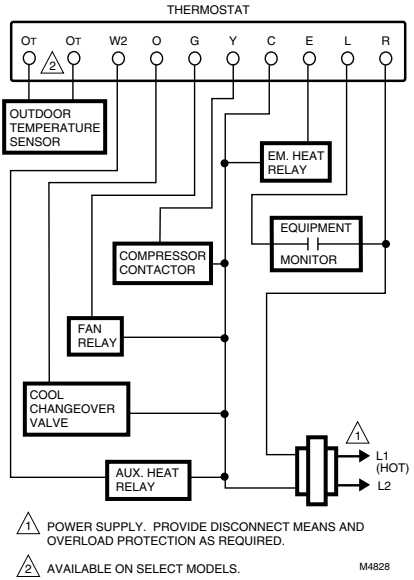


Fig. 4. Typical hookup in heat pump system with emergency heat relay.

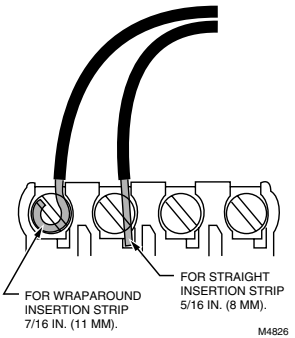
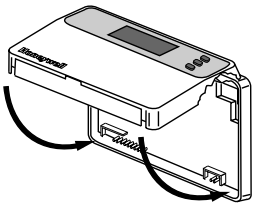


Fig. 6. Proper wiring technique.

Mounting Thermostat

1. Engage tabs at the top of the thermostat and wallplate. See Fig. 7.
2. Press lower edge of case to close and latch.

A. ENGAGE TABS AT TOP OF THERMOSTAT AND WALLPLATE.



B. PRESS LOWER EDGE OF CASE TO LATCH.

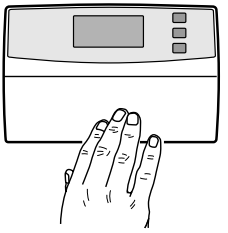


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Fig. 7. Mounting thermostat on wallplate.

NOTE: To remove the thermostat from the wall, first pull out at the bottom of the thermostat; then remove top.

Using Thermostat Keys

Use thermostat keys to:

- Set temperature,
- Display present setting,
- Configure Installer Setup,
- Check System-Test,
- Display outdoor temperature (select models).
- Set system operation,
- Set fan operation.

See Fig. 8 for the key information.

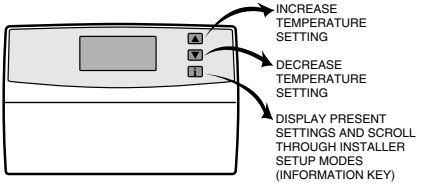
INCREASE TEMPERATURE SETTING
DECREASE TEMPERATURE SETTING
DISPLAY PRESENT SETTINGS AND SCROLL THROUGH INSTALLER SETUP MODES (INFORMATION KEY)

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Fig. 8. Thermostat key locations and descriptions.

SETTINGS

System and Fan Settings

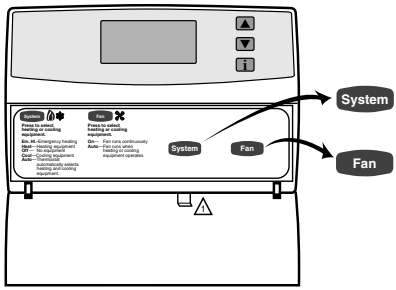
System settings control the thermostat operation as follows:

Em. Heat: Emergency heat relay is automatically controlled by the thermostat. The cooling system is off. The compressor is de-energized.
Heat: The thermostat controls the heating.
Off: Both the heating and cooling are off.
Cool: The thermostat controls the cooling.
Auto: The thermostat automatically changes between heating and cooling operation, depending on the indoor temperature.

Fan settings control the system fan as follows:

On: Fan operates continuously.
Auto: Equipment controls fan.

The system default setting is Heat and the fan default setting is Auto. Use the keyboard to change to the desired settings. See Fig.10.



⚠1 CHECK LIGHT ON SELECT MODELS

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Fig. 10. T8511G (automatic changeover) system and fan key locations.

NOTE: Always press the system and fan keys with your fingertip or similar blunt tool. Sharp instruments like a pen or pencil point can damage the keyboard.

Temperature Settings

The default setpoint for heat is 70°F (21°C) and for cool is 78°F (25.5°C). Press the increase ▲ or decrease ▼ key to change the present setting. To change between heat and cool, press the Information [i] key until the setting to be changed appears.

INSTALLER SETUP

NOTE: For most applications, the thermostat factory settings do not need changing. Review the Factory Setting column in Table 2 and if no changes are necessary, go to the Installer System-Test section.

Use the Installer Setup to customize the thermostat to specific systems. Some of the options include temperature display, changeover, minimum equipment on time and minimum off time. Installer Setup numbers are listed in Table 2. It includes all the configuration options and the factory-settings available for the T8511.

IMPORTANT

The Installer Setup must be set correctly for the HVAC equipment, thermostat and subbase to operate properly.

A combination of key presses are required to use the Installer Setup feature:

1. To enter the Installer Setup, press and hold the Information [i] key and the increase ▲ and decrease ▼ keys until the first number displays. All display segments appear for approximately three seconds before the number displays. See Fig. 11 and 12.
2. To advance to the next Installer Setup, press the Information [i] key.
3. To change a setting, press the increase ▲ or decrease ▼ key.
4. To exit the Installer Setup, press and hold the Information [i] key until the display returns to normal (approximately three seconds). The display scrolls the numbers backward to get to the normal display. The Installer Setup is automatically exited if no key presses are made for five minutes.

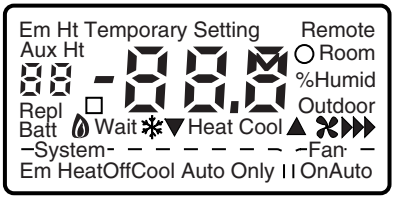

Fig. 11. Display of all LCD segments.

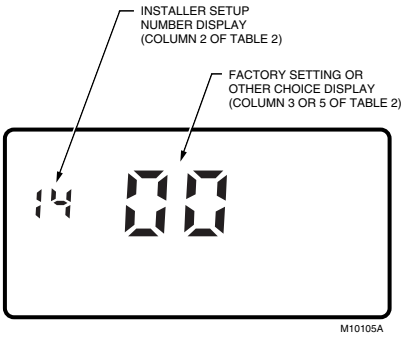
INSTALLER SETUP NUMBER DISPLAY (COLUMN 2 OF TABLE 2)
FACTORY SETTING OR OTHER CHOICE DISPLAY (COLUMN 3 OR 5 OF TABLE 2)
14
00
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Fig. 12. Display of installer setup and setting.

NOTE: Only configurable numbers are shown.

Table 2. Thermostat Installer Setup Options.

Select	Installer Setup Number (Press [i] key to change)	Factory Setting		Other Choices (Press ▲ or ▼ key to change)		Actual Setting
		Display	Description	Display	Description	
Not used.	01 thru 04	—	—	—	—	—
Heating cycle rate.	05	03	Stage 2.	03, 06 or 09	03—3 cph used for stage 1 heat pump systems.	
	06	—	Not used.			—
	07	09	Emergency heat.		06—6 cph used for conventional systems. 09—9 cph used for electric heat systems.	
Not used.	08 thru 11	—	—	—	—	—
Changeover (T8511G only).	12	01	Manual changeover.	00	00—Automatic changeover.	
Not used.	13	—	—	—	—	—
Degree temperature display.	14	00	Temperature is displayed in °F.	01	Temperature is displayed in °C	
Not used.	15 thru 18	—	—	—	—	—

[a] The cycle rate for the last stage of heat is adjustable with 6 as the factory setting.

(continued)

Table 2. Thermostat Installer Setup Options (Continued).

Select	Installer Setup Number (Press i key to change)	Factory Setting		Other Choices (Press ▲ or ▼ key to change)		Actual Setting
		Display	Description	Display	Description	
Extended fan operation in heating.	19	00	No extended fan operation after the call for heat ends.	01	Fan operation is extended 90 seconds after the call for heat ends.	
Extended fan operation in cooling.	20	00	No extended fan operation after the call for cool ends.	01	Fan operation is extended 90 seconds after the call for cool ends.	
Not used.	21 thru 23	—	—	—	—	—
Outdoor temperature display.	24	00	No outdoor temperature is displayed.	01	Outdoor temperature is displayed. Needs a C7089B1000 Outdoor Sensor to operate.	
Not used.	25 thru 28	—	—	—	—	—
O/B terminal energized in heating or cooling.	29	00	O/B terminal is energized for reversing valve in cooling.	01	O/B terminal is energized for reversing valve in heating.	
Not used.	30 thru 32	—	—	—	—	—
Minimum off time for the compressor.	33	05	5 minute minimum off-time for the compressor.	00, 01, 02, 03 or 04	Minimum number of minutes (0 thru 5) the compressor will be off between calls for the compressor.	
Heating setpoint range stop.	34	90	Heating setpoint can be set no higher than 90°F.	40 thru 90	Number can be set anywhere between 40 and 90 in 1°F increments.	
Cooling setpoint range stop.	35	45[a]	Cooling setpoint can be set no lower than 48°F.	48 thru 99	Number can be set anywhere between 48 and 99 in 1°F increments.	
System On display.	36	00	LCD On symbol is displayed when system is energized.	01	Display is disabled, usually set for 01 for a zoned system.	
Temperature display adjustment.	37	00	No difference in displayed temperature and actual room temperature.	-3 thru 03	01—Display adjusts to 1°F higher than actual room temperature. 02—Display adjusts to 2°F higher than actual room temperature. 03—Display adjusts to 3°F higher than actual room temperature. -1—Display adjusts to 1°F lower than actual room temperature. -2—Display adjusts to 2°F lower than actual room temperature. -3—Display adjusts to 3°F lower than actual room temperature.	

INSTALLER SYSTEM-TEST

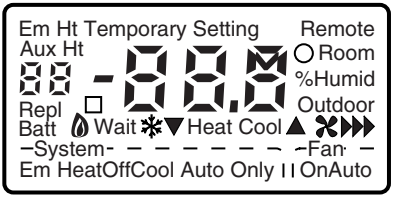
Use the Installer System-Test to check the thermostat configurations and operation. Refer to Table 3 for a list of the available system-tests.

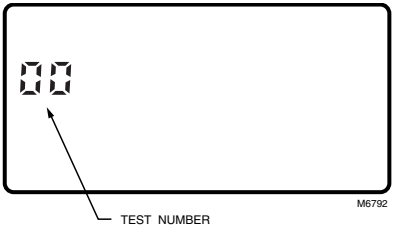
To start the system-test:

⚠ CAUTION

Equipment Damage Hazard.
Minimum compressor off-time is bypassed during the Installer System Test.
Be aware that equipment damage can occur if the compressor is cycled too quickly.

Press and hold the increase ▲ and decrease ▼ keys, at the same time, until two zeros appear. All segments of the LCD are displayed before the zeros appear.





NOTE: Press and hold the increase ▲ and decrease ▼ keys for three seconds to exit the system-test. The system-test times out after five minutes without any key presses.

Table 3. Installer System-Tests.

Test Number	System-Test Description
10-19	Heating equipment can be turned on and off
20-29	Emergency heat (select models) equipment can be turned on and off
30-39	Cooling equipment can be turned on and off
40-49	Fan equipment can be turned on and off
60-69	System key or system switch position test
70-79	Thermostat information displayed including date code and software versions.

Refer to Table 4 for descriptions of the specific tests.

Table 4. Installer System-Test Options.

Key To Press	Test Number	Description
Heating Equipment System-Test		
i	10	Enter heating equipment system-test.
▲	11	Stage-one heat comes on. The system fan is also energized.
▲	12	Stage-two heat comes on. Stage-one heat and system fan remain on.
▼	11	Stage-two heat turns off.
▼	10	Stage-one heat and system fan turn off.
Emergency Heating Equipment System-Test[a]		
i	20	Change from heating to emergency heating equipment system-test.
▲	21	Emergency heat comes on. System fan also comes on.
▼	20	Emergency heat turns off.
Cooling Equipment System-Test		
i	30	Change from heating or emergency heating to cooling equipment system-test.
▲	31	Stage-one cooling and system fan come on.
▼	30	Stage-one cool and system fan turn off.

[a] Available on select models.

(continued)

Table 4. Installer System-Test Options (Continued).

Key To Press	Test Number	Description
Fan Equipment System-Test		
i	40	Change from cooling to fan equipment system-test.
▲	41	Fan comes on.
▼	40	Fan turns off.
System Key ***IMPORTANT*** *Test numbers are displayed only when the system is configured for the selected function. EXAMPLE: Numbers 60, 61 and 62 are the only numbers that are displayed when a system is configured for heat only.*		
SYSTEM KEY		
i	60	Change from fan to key operation system-test.
System	61	Heat Test number is displayed.
System	62	Off Test number is displayed.
System	63	Cool Test number is displayed.
System	64	Auto Test number is displayed.
System	65	Emergency Heat Test number is displayed. NOTE: Press system key again to repeat the System Key System-Test.
FAN KEY SYSTEM-TEST		
Fan	68	Fan On Test number is displayed.
Fan	69	Fan Off Test number is displayed.

Thermostat Information

1. Press the Information i key to access the thermostat information.

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2. Press the increase ▲ key to display the production date code. The first two large digits are the month and the third digit is the last digit of the year (Example: 026 = February 1996).

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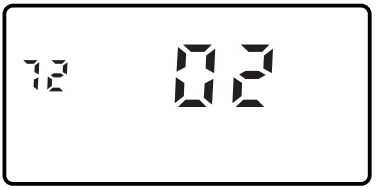
3. Press the increase ▲ key again to display the software identification code (Example: 02 = software ID code 2).



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4. Press the increase ▲ key again to display the software revision number (Example: 001 = revision number 1).

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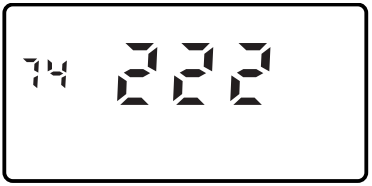
5. Press the increase ▲ key again to display the EEPROM identification code (Example: 222 = EEPROM ID 222).



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6. Press and hold the increase ▲ and decrease ▼ keys until the room temperature is displayed to exit the system-test. The system-test times out after five minutes without any key presses.

CHECKOUT

Outdoor Temperature Sensor (Where Applicable)

Allow the outdoor temperature sensor to absorb the outdoor air for a minimum of five minutes before taking a reading. With an accurate thermometer (±1°F [±0.5°C]), measure the temperature at the sensor location, allowing time for the thermometer to stabilize before reading. Match the thermometer reading to the outdoor temperature display at the thermostat.

TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Action
Display will not come on.	Thermostat is not being powered.	• Check that C terminal is connected to the system transformer. • Check for 24 Vac between C and R or RH terminals. — If missing 24 Vac: — Check if the circuit breaker is tripped—reset the circuit breaker. — Check if the system fuse is blown—replace the fuse. — Check if the power switch on the HVAC equipment is in the Off position—set to the On position. — Check wiring between thermostat and HVAC equipment—replace any broken wires and tighten any loose connections. — If 24 Vac is present, proceed with troubleshooting.
	Thermostat microprocessor is locked up.	Remove the thermostat from the wallplate for 2 minutes. After 2 minutes, replace the thermostat on the wallplate.
Temperature display is incorrect.	Room temperature display has been reconfigured.	Enter Installer Setup mode number 37 and reconfigure the display.
	Thermostat is configured for °F or °C display [a].	Enter Installer Setup mode number 14 and reconfigure the display.
	Bad thermostat location.	Relocate the thermostat.
Temperature settings will not change. (Example: Cannot set the heating higher or the cooling lower.)	The upper or lower temperature limits were reached.	Check the temperature setpoints: • Heating limits are 40 to 90°F (4.5 to 32°C). • Cooling limits are 48 to 99°F (9 to 37°C).
	The setpoint temperature range stops were configured.	Check Installer Setup mode numbers 34 and 35 and reconfigure the setpoint stops.
Heating will not come on.	No power to the thermostat.	• Check that C terminal is connected to the system transformer. • Check for 24 Vac between C and R or RH terminals. — If missing 24 Vac: — Check if the circuit breaker is tripped—reset the circuit breaker. — Check if the system fuse is blown—replace the fuse. — Check if the system switch at the equipment is in the Off position—set to On position. — Check wiring between thermostat and HVAC equipment—replace any broken wires and tighten any loose connections. — If 24 Vac is present, proceed with troubleshooting.

[a] Available on select models.

(continued)

TROUBLESHOOTING GUIDE (Continued)

Symptom	Possible Cause	Action
Heating will not come on. (continued)	Thermostat minimum off-time is activated.	Wait up to five minutes for the system to respond.
	System selection is not set to Heat.	Set system selection to Heat.
	O/B terminal configured incorrectly[a].	Check Installer Setup mode number 29 and reconfigure correctly.
	O or B terminal miswired[a].	Check system description to determine whether changeover should be energized in heat (B) or cool (O). Rewire if necessary.
Cooling will not come on.	No power to the thermostat.	• Check that C terminal is connected to the system transformer. • Check for 24 Vac between C and R or RC and Y terminals. — If missing 24 Vac: — Check if the circuit breaker is tripped—reset the circuit breaker. — Check if the system fuse is blown—replace the fuse. — Check if the system switch at the equipment is in the Off position—set to the On position. — Check wiring between thermostat and HVAC equipment—replace any broken wires and tighten any loose connections. — If 24 Vac is present, proceed with troubleshooting.
	Thermostat minimum off-time is activated.	• Wait up to five minutes for the system to respond. • Enter Installer Setup mode number 33. Reconfigure minimum off-time (if required).
	System selection is not set to Cool.	Set system selection to Cool.
	O/B terminal configured incorrectly[a].	Check Installer Setup mode number 29 and reconfigure correctly.
	O or B terminal miswired[a].	Check system description to determine whether changeover should be energized in heat (B) or cool (O). Rewire if necessary.
System On indicator is lit, but no heat is being delivered.	Heating equipment is not operating.	Verify operation of heating equipment in system-test.

[a] Available on select models.

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